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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,475	08/29/2001	Hideki Sawaguchi	ASAM.0019	4883

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EXAMINER
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RODRIGUEZ, GLENDA P

ART UNIT	PAPER NUMBER
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2627

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/940,475	Applicant(s) SAWAGUCHI ET AL.	
	Examiner Glenda P. Rodriguez	Art Unit 2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25 and 26 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 8, 10-14, 17, 19, 21-24 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 7, 9, 15, 16, 18 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 6, 8, 10-12, 17, 19 and 21-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Tagushi (US Patent No. 5, 986, 987).

Regarding Claims 1 and 12, Taguchi et al. teaches a magnetic recording/reproducing apparatus comprising a perpendicular magnetic recording double-layer medium with a soft magnetic underlayer and a reproducing head by a magneto resistive effect type head with a shield film,

Wherein a reproduced signal is outputted from said reproducing head is processed through a partial response equalization circuit having a frequency characteristic so that a low-frequency component is passed and suppressed through said partial response equalization circuit (See Fig. 9, wherein the PRML channel is disclosed as having an equalizer in Element 7 and Col. 17, L. 61-66. See Col. 1, L. 11-14, wherein magnetic-optic media can also be used.); and

Wherein said reproduced signal is supplied to a maximum-likelihood decoder so as to be data-reproduced (Col. 22, L. 52-67, wherein it teaches data being decoded

by Elements 25a and 25b in order to be reproduced, hence being the decoders of the data.).

Regarding Claims 6 and 17, Taguchi et al. teach all the limitations of Claims 1 and 12, respectively. Taguchi et al. further teach wherein having more than one partial response circuits (See Fig. 55, wherein elements 14-1 and 14-2, detect and decode different edges of data (particularly trailing and leading edges) as disclosed in the Specification in Col. 29, L. 66 to Col. 30, L. 15) and the waveforms are supplied to Element 7 are equalized in the PRML channel in Element 7a.

Regarding Claim 8 and 19, Taguchi et al. teaches all the limitations of Claims 6 and 17, respectively. Taguchi et al. further teach wherein at least one of said different direct current frequency component passing characteristics is a cut-off characteristic of a direct current frequency component (Taguchi teaches having DC characteristics in Col. 17, L. 61-66 according to the Applicants Specification in Page 29, 14-19).

Regarding Claims 10 and 21, Taguchi et al. teach all the limitations of Claim 1 and 12, respectively. Taguchi et al. further teach wherein an information bit sequence to be recorded is converted into a data bit sequence so that a maximum number  $m$  of consecutive recording transitions recorded at a shortest bit length interval on said recording medium is limited to a finite value, and then said converted data bit sequence is recorded on said recording medium (Col. 7, L. 64-Col. 8, L. 1).

Regarding Claims 11 and 22, Taguchi et al. teach all the limitations of Claim 1 and 12, respectively. Taguchi et al. further teach wherein the maximum number of  $m$  consecutive recording transitions is less than 4 (Its 3 according to Col. 7, L. 64-Col. 8, L. 1.).

Regarding Claim 23, Taguchi et al. teaches all the limitations of Claim 12. Taguchi et al. further teaches having a processing circuit in which data signal is sampled and processed mounted thereon as seen in Fig. 9 and 55.

*Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al. in view of Wong et al. (US Patent No. 6, 275, 468).

Regarding Claims 2 and 13, Taguchi et al. teaches all the limitations of Claims 1 and 12, respectively. Taguchi does not explicitly teach that the waveforms contain some degree of intersymbol interference (or ISI for short). This limitation is taught by Wong et al. in Col. 5, L. 31-44. It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Taguchi's invention with the teaching of Wong et al. in order to be able to accommodate changes of media and non-homogeneities which can also occur in the media.

Regarding Claims 3 and 14, the combination of Taguchi et al. and Wong et al. teaches all the limitations of Claims 2 and 13, respectively. The combination further teach having ISI ratios depending on the amplitudes and bit intervals as shown in the Fig. 3B and Col. 8, L. 3-25, wherein it teaches bit intervals and amplitudes being measured order to compensate for variations in the media.

5. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al. in view of Kikuta (US Patent No. 6, 377, 416). Taguchi et al. teaches all the limitations of Claim 23. However, Taguchi et al. does not explicitly teach wherein having a semiconductor integrated circuit mounted on the device. Kikuta teaches having a semiconductor integrated circuit mounted on the device in Col. 1, L. 9-16. It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Taguchi et al.'s invention with the teaching of Kikuta in order to process the data given to the circuit.

***Allowable Subject Matter***

6. Claims 4, 5, 7, 9, 15, 16, 18 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claim 4 and 15, the primary reason for allowable subject matter is the inclusion of the limitation wherein an operation circuit which operates to subtract a signal value obtained in a manner so that each input signal supplied to said equalization circuit is delayed by a predetermined bit time and the delayed input signal is increased by  $\alpha$  times, from said input signal.

Regarding Claim 5 and 16, the primary reason for allowable subject matter is the inclusion of the limitation wherein a value of a parameter  $\alpha$  not smaller than 0.1 is used.

Regarding Claim 7 and 18, the primary reason for allowable subject matter is the inclusion of the limitation wherein one of different direct current frequency component passing

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characteristics or one of different values of parameter  $\alpha$  is selected and set in said partial response equalization circuit.

Regarding Claim 9 and 20, the primary reason for allowable subject matter is the inclusion of the limitation wherein a signal for adjusting or controlling a circuit disposed in a pre-stage of said partial response equalization circuit is referred to from a circuit in a post-stage of said partial response equalization circuit having said cut-off characteristic of said DC frequency component.

7. Claims 25 and 26 are allowed.

The following is an examiner's statement of reasons for allowance: the primary reason for allowance is the inclusion of the combination of a perpendicular magnetic recording medium having a equalization circuit which performs a process of suppressing a low-frequency component including a direct current component in reproduced signals output from the reproducing head.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

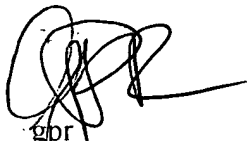
8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Rae et al. (US Patent No. 6, 594, 094) and Murakami et al. in (US Patent No. 6, 671, 112).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenda P. Rodriguez whose telephone number is (571) 272-7561. The examiner can normally be reached on Monday thru Thursday: 7:00-5:00; alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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03/14/06.



WAYNE YOUNG  
SUPERVISORY PATENT EXAMINER